REMARKS

In response to the Office Action mailed June 9, 2003, claim 30 has been amended. Claims 18, 30, 31 and 33-35 are now active in this application, of which claims 18 and 30 are independent. Applicants respectfully submit that the above amendments do not add new matter to the application as they are made only for correcting informalities. Based on the following Remarks, Applicants respectfully request that the Examiner reconsider the outstanding objections and rejections and they be withdrawn.

Rejections Under 35 U.S.C. §103

In the Office Action, claims 18, 30, 31, 34 and 35 have been rejected under 35 U.S.C. §103(a) for being unpatentable over U. S. Patent No. 5,259,881 issued to Edwards, *et al.* ("Edwards") in view of U. S. Patent No. 5,259,881 issued to Kwasnick, *et al.* ("Kwasnick") and U. S. Patent No. 5,578,520 issued to Zhang, et al. ("Zhang"). This rejection is respectfully traversed.

Independent claim 18 specifically recites:

> "An apparatus for depositing a layer on a substrate for a liquid crystal device, comprising:
> ...
> a deposition chamber depositing a gate insulating layer, an amorphous silicon layer and a doped amorphous silicon layer by chemical vapor deposition; and
> a sputter chamber depositing a metal layer on the doped amorphous silicon layer by sputtering
> ...
> wherein the substrate is transferred from said deposition chamber to said sputter chamber **in a vacuum**"

Since the substrate is transferred from the deposition chamber to the sputter chamber **in vacuum**, an oxide layer is prevented from being deposited on the amorphous silicon layer. Thus,

"the on current of the TFT is increased. Further HF cleaning can be omitted because no oxide layer is formed. Therefore, the overall TFT manufacturing process is simplified" (Specification, page 12, lines 4-6).

Edwards is directed to a wafer processing cluster tool having chambers for preheating, annealing, sputtering and CVD that are maintained in vacuum. However, as the Examiner admitted, "utilizing the chambers for forming layers of a thin film is not discussed, the layers of a thin film transistor is not discussed and depositing the layers in a series of chambers is not discussed" (Office Action, page 6).

Particularly, Edwards does not disclose the specifically claimed functions of each chambers. Particularly, Edwards does not disclose "a deposition chamber depositing *a gate insulating layer, an amorphous silicon layer and a doped amorphous silicon layer* by chemical vapor deposition" and "a sputter chamber depositing *a metal layer **on** the doped amorphous silicon layer* by sputtering", as recited in claim 1. Thus, Edwards would not be able to disclose "the substrate is transferred from said deposition chamber to said sputter chamber in a vacuum" since the CVD chamber and sputter chamber in Edwards do not perform the specific functions recited in claim 1.

Kwasnick teaches a method for manufacturing a thin film transistor structure. Kwasnick is not directed to an apparatus for manufacturing a thin film transistor device. Thus, Kwasnick does not disclose "a **deposition chamber** depositing *a gate insulating layer, an amorphous silicon layer and a doped amorphous silicon layer* by chemical vapor deposition" and "a **sputter chamber** depositing *a metal layer **on** the doped amorphous silicon layer* by sputtering", as claimed.

Kwasnick discloses "a layer 30 of intrinsic amorphous silicon ... is deposited on the gate dielectric layer without breaking vacuum in the deposit chamber. Next, a layer 32 of n+ amorphous silicon ... is deposited on the top of the intrinsic silicon 30, again without breaking the vacuum in the deposit chamber"" (column 4, lines 58-65). This description only describes depositing amorphous silicon layers 30 and 32 without breaking vacuum. However, this description is not directed to the claimed feature that "the substrate is **transferred** from said deposition chamber to said sputter chamber in **a vacuum**". Thus, Kwasnick fails to cure the deficiency from Edwards.

Zhang discloses an annealing method by using at least two chambers that are arranged in series. However, Zhang fails to "a deposition chamber depositing *a gate insulating layer, an amorphous silicon layer and a doped amorphous silicon layer* by chemical vapor deposition" and "a sputter chamber depositing *a metal layer **on** the doped amorphous silicon layer* by sputtering", as recited in claim 1. Also, Zhang does not disclose "the substrate is transferred from said deposition chamber to said sputter chamber in a vacuum". Thus, Zhang fails to cure the deficiency from Edwards and Kwasnick.

Since none of the cited references disclose the aforementioned claimed features, the claimed invention would not have been obvious to obtain by combining the teachings thereof. Thus, it is submitted that claim 18 is patentable over Edwards, Kwasnick and Zhang.

Independent claim 30 recites

> "An apparatus for manufacturing a liquid crystal display, comprising:
> ...
> a second deposition chamber for depositing a doped amorphous silicon layer on the substrate;
> a sputter chamber for depositing a metal layer on the doped amorphous silicon layer; and

a vacuum passage for transferring the substrate in a vacuum from said second deposition chamber to said sputter chamber to prevent oxidization of an upper surface of the doped amorphous silicon layer,
..."

As previously mentioned, none of the cited references discloses the above claimed limitations. Thus, it is submitted that independent claim 30 is patentable over Edwards, Kwasnick and Zhang. Claims 31 and 33-35 that are dependent from claim 31 would be also patentable at least for the same reason.

Accordingly, Applicants respectfully request that the rejection over claims 18, 30, 31 and 33-35 be withdrawn.

In the Office Action, claims 18, 30, 31 and 33-35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 5,512,320 issued to Turner, et al. ("Turner") in view of Kwasnick. This rejection is respectfully traversed.

Turner discloses a vacuum processing apparatus that has several CVD chambers and a heating chamber. However, Turner does not teach the claimed deposition chamber *specifically* for depositing a doped amorphous silicon layer on the substrate and the claimed sputter chamber *specifically* for depositing a metal layer on the doped amorphous silicon layer. Turner even fails to disclose any kind of sputtering chamber itself. Thus, Turner would fail to disclose any kind of vacuum passage for transferring a substrate, on which an amorphous silicon layer is formed, in a vacuum from the deposition chamber to the sputter chamber.

As previously mentioned, Kwasnick is not directed to an apparatus for manufacturing a thin film transistor device. Thus, Kwasnick does not disclose a **deposition chamber** depositing *a doped amorphous silicon layer* or a **sputter chamber** depositing *a metal layer* ***on*** *the doped*

amorphous silicon layer". Also, Kwasnick fails to disclose "the substrate is **transferred** from said deposition chamber to said sputter chamber in **a vacuum**". Thus, Kwasnick fails to cure the deficiency from Turner.

For these reasons, it is submitted that the claimed invention would not have been obviously achieved by simply combining Turner and Edwards. Thus, it is submitted that claims 18, 30, 31 and 33-35 are patentable over Turner and Edwards. Accordingly, Applicants respectfully request that the rejection over claims 18, 30, 31 and 33-35 be withdrawn.

Other Matters

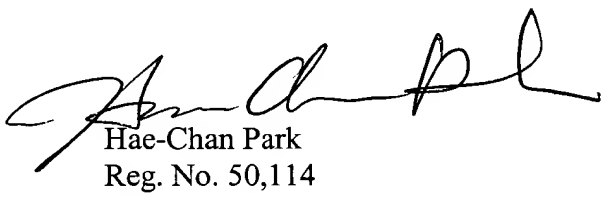
In this response, claim 30 has been amended to correct an antecedent basis error therein.

CONCLUSION

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete response has been made to the outstanding Office Action and, as such, claims 18, 30, 31 and 33-35 are in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment is respectfully requested.

Respectfully submitted,



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Date: September 3, 2003

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